

### **REMARKS**

Claims 1-13 are all of the claims presently pending in the application. Claims 1-6 have been merely editorially amended and have not been substantively amended to more particularly define the invention or to overcome the Examiner's rejections. Claims 7-13 have been added to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-2 and 4-5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kashima et al. (U.S. Patent No. 4,163,000) (hereinafter "Kashima"). Claims 3 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kashima in view of Sutton et al. (U.S. Patent No. 5,735,334) (hereinafter "Sutton").

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

The claimed invention (e.g., as defined by claim 1) is directed to a method of casting aluminum or aluminum alloy including producing a sand mold, injecting at least one of molten aluminum and molten aluminum alloy into the sand mold, cooling a casting thus obtained together with the sand mold by at least one of water and a liquid coolant, and dismantling the sand mold.

Conventional casting methods have been employed that use green sand molds for casting molten metals and metal alloys. The conventional methods include injecting molten metal into a green sand mold, primarily cooling the casting down to a temperature lower than the solidus temperature, collapsing a part of the green sand mold that has not been thermally affected to separate and remove the mold, and secondarily cooling the casting that is surrounded by the remaining sand. However, there is no conventional method that is capable of casting aluminum or aluminum alloy using a mold made of green sand. Conventional methods use metal molds for casting aluminum and aluminum alloy because the metal molds ensure that cooling speed is sufficiently high near the solidus line.

The claimed invention of exemplary claim 1, on the other hand, provides a method of casting aluminum or aluminum alloy including producing a sand mold, injecting at least one of molten aluminum and molten aluminum alloy into the sand mold, and cooling a casting thus obtained together with the sand mold by at least one of water and a liquid coolant (e.g., see Application at page 2, line 27 through page 3, line 4).

## II. THE PRIOR ART REFERENCES

### A. The Kashima Reference

The Examiner alleges that Kashima teaches the claimed invention of claims 1, 2, 4 and 5. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested by Kashima.

That is, Kashima does not teach or suggest “*cooling a casting thus obtained together with the sand mold by at least one of water and a liquid coolant*” as recited in claim 1.

The Examiner attempts to rely on column 7, lines 62-69 and column 9, lines 25-31 of Kashima to support his allegations. The Examiner, however, is clearly incorrect.

That is, nowhere in these passages (nor anywhere else for that matter) does Kashima teach or suggest cooling a casting thus obtained together with the sand mold by at least one of water and a liquid coolant. Indeed, Kashima does not even mention the manner in which the casting and/or the mold is cooled, let alone teach or suggest that the casting is cooled together with the mold by at least one of water and liquid coolant.

Kashima merely states that molten iron is poured into the mold and then cooled. Kashima does not mention how the molten iron is cooled, let alone teach or suggest that it is cooled with water or a liquid coolant as alleged by the Examiner.

Furthermore, Kashima does not teach or suggest that the molten iron is cooled with the mold. Kashima merely teaches that the mold is dipped in water after cooling, to disintegrate the mold to give the casting a smooth surface. The mold is not cooled by the water. Kashima clearly states the mold is not dipped into the water until after it is already cooled.

Therefore, Applicants submit that there are elements of the claimed invention that are not taught or suggest by Kashima. Therefore, the Examiner is respectfully requested to withdraw this rejection.

**B. The Sutton Reference**

The Examiner alleges that Sutton would have been combined with Kashima to form the claimed invention of claims 3 and 6. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, these references are directed to different problems and solutions. Specifically, Sutton is directed to increasing the rate at which casting may be made, whereas Kashima is merely directed to a foundry mold composition having various advantages including freedom from environmental pollution. Therefore, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

Furthermore, the Examiner's motivation to modify Kashima ("to increase production rate") does not appear to be a problem in Kashima that would require a solution. Thus, as pointed out in MPEP 2143.01, the Examiner's motivation is "improper". "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination" (emphasis added by Applicants). Here, the prior art does not suggest the Examiner's urged desirability of the combination.

Moreover, neither Sutton, nor Kashima, nor any combination thereof teaches or suggest "*dipping the at least one unit sand mold into at least one of water and a liquid coolant to cool a thus obtained casting together with the sand mold*" as recited in claim 3.

The Examiner attempts to rely on column 2, lines 14-30 and column 3, lines 36-54 to support his allegations. The Examiner, however, is clearly incorrect.

That is, nowhere in these passages, nor anywhere else for that matter does Sutton teach or suggest cooling a casting thus obtained together with the sand mold by at least one of water and a liquid coolant. Indeed, the Examiner does not even allege that Sutton teaches or suggests this feature. In fact, the Examiner merely relies upon Sutton as teaching the steps of producing a unit sand mold within a mold making chamber on a casting line for the purpose of increasing the rate of production. Therefore, Sutton clearly does not make up for the deficiencies of Kashima.

Therefore, Applicants submit that the cited references would not have been combined as alleged by the Examiner, and that even combined, the combination of Kashima and Sutton

would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

### III. NEW CLAIMS

New claims 7-13 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention. These claims are independently patentable because of the novel features recited therein.

Applicants respectfully submit that new claims 7-13 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 1-6.

### IV. FORMAL MATTERS AND CONCLUSION

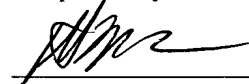
In view of the foregoing, Applicants submit that claims 1-13, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Date: January 27, 2005

Respectfully Submitted,



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